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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/786,507	02/25/2004	Eric Bouillon	BDL-451XX	4009
207	7590	04/03/2006	EXAMINER	
WEINGARTEN, SCHURGIN, GAGNEBIN & LEBOVICI LLP TEN POST OFFICE SQUARE BOSTON, MA 02109			AGRAWAL, CHRISTOPHER K	
			ART UNIT	PAPER NUMBER
			3726	

DATE MAILED: 04/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)
	10/786,507	BOUILLOU ET AL.
	Examiner	Art Unit
	Christopher K. Agrawal	3726

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

1) Responsive to communication(s) filed on 27 February 2006.  
 2a) This action is **FINAL**.                    2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

4) Claim(s) 1,2 and 4-15 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_\_ is/are allowed.  
 6) Claim(s) 1,2 and 4-15 is/are rejected.  
 7) Claim(s) \_\_\_\_\_ is/are objected to.  
 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

1) Notice of References Cited (PTO-892)                    4) Interview Summary (PTO-413)  
 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)                    Paper No(s)/Mail Date. \_\_\_\_\_.  
 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
 Paper No(s)/Mail Date \_\_\_\_\_.                    5) Notice of Informal Patent Application (PTO-152)  
 6) Other: \_\_\_\_\_.

## DETAILED ACTION

### ***Allowable Subject Matter***

1. The indicated allowability of claims 3-5 is withdrawn in view of examiner's reconsideration of the prior art and of applicant's claimed invention. Rejections based on the new grounds follow.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. **Claims 1, 2, 12, 13 and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Boyce et. al. (U.S. Patent No. 4,808,461).**

4. Claim 1: Boyce et. al. teach a method of making a fiber blank 30 from at least one porous fiber structure, the method comprising the steps of: consolidating the porous fiber structure by forming within it a deposit of a refractory material (Col. 2 lines 30-36) by partially densifying the fiber structure so as to bond together the fibers of the fiber structure to enable the fiber structure to be handled without being deformed (Col. 2 lines 46-51), and implanting rigid pins through the consolidating porous structure (Col. 2 lines 15-25; Fig. 5) wherein said at least one fiber structure is consolidated by reducing its pore volume by no more than 40% of its initial value.

5. With respect to leaving empty the major fraction of the initial pore volume of the fiber structure, this limitation is interpreted to be anticipated by the recital of Boyce of selectively pressing during consolidation (**Col. 2 lines 46-51**).

6. With respect to consolidating by reducing pore volume by no more than 40% of the initial value, examiner notes that consolidation by no more than 40% is inherent in the reference of Boyce. Specifically, the method of implanting rigid pins into the fiber structure necessarily results in at least some reduction of pore volume; however, Figures 4-6 indicate that pore volume is not nearly reduced to 40% of its initial value.

7. Claim 2: Boyce et. al. teach a method of making a fiber blank by bonding together porous fiber structures in order to obtain a blank of desired shape (**Fig. 2; see 32**), the method comprising the following steps: consolidating each porous fiber structure by forming within it a deposit of a refractory material by partially densifying the fiber structure so as to bond together the fibers of the fiber structure to enable the fiber structure to be handled without being deformed (**Col. 2 lines 30-36 and 46-51**); putting the consolidated fiber structures together; and connecting them together by implanting pins of rigid material through the adjoining consolidated fiber structures (**Col. 2 lines 15-25; Fig. 5**) wherein said at least one fiber structure is consolidated by reducing its pore volume by no more than 40% of its initial value.

8. With respect to leaving empty the major fraction of the initial pore volume of the fiber structure, this limitation is interpreted to be anticipated by the recital of Boyce of selectively pressing during consolidation (**Col. 2 lines 46-51**).

Art Unit: 3726

9. With respect to consolidating by reducing pore volume by no more than 40% of the initial value, examiner notes that consolidation by no more than 40% is inherent in the reference of Boyce. Specifically, the method of implanting rigid pins into the fiber structure necessarily results in at least some reduction of pore volume; however, Figures 4-6 indicate that pore volume is not nearly reduced to 40% of its initial value.

10. Claim 12: Boyce et. al. also teach the method of claim 1 wherein pins are used that are made in the form of rigid monofilaments (**Col. 2 lines 2-5**).

11. Claim 13: Boyce et. al. also teach the method of claim 1 wherein the pins are used in the form of sticks of thermostructural composite material (**Col. 2 lines 5-30**).

12. Claim 15: Boyce et. al. also teach the method of making a fiber-reinforced composite material part, wherein a blank is made of shape corresponding to the shape of the part that is to be made by means of a method according to claim 1 (**Figs. 2 and 8; Col. 3 lines 30-33**), after which the blank is densified by depositing a matrix within the remaining pore volume of each consolidated fiber structure (**Col. 2 lines 31-36; Col. 3 lines 36-65**).

### ***Claim Rejections - 35 USC § 103***

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

14. **Claims 4-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Boyce et. al. (U.S. Patent No. 4,808,461).**

15. Claim 4: Boyce et. al. teach the method of claim 1 as described above but do not specifically teach the method wherein said at least one fiber structure is consolidated by reducing its pore volume by an amount lying in the range of 8% to 40% of its initial value.

16. It would have been obvious to one of ordinary skill in the art at the time of the invention to have incorporated a reduction of pore volume in the amount lying in the range of 8% to 60%. Boyce et. al. teach that insertion of rigid pins in the consolidated porous structure results in significant enhancement of the composite structure including improvement in critical strain energy release rate without a decrease in in-plane tensile strength or interlaminar shear strength (**Col. 4 lines 8-20**). It follows that, Boyce et. al. teach the principle that insertion of pins results in porosity dynamics effective for strength property modification. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified (decreased) the pore volume by the insertion of reinforcing pins anywhere within the range of 8% to 60% for the purpose of selectively modifying the strength properties of the composite material.

17. Claim 5: Boyce et. al. teach the method of claim 1 as described above but do not specifically teach the method wherein said at least one fiber structure used has a pore volume ratio lying in the range of 50% to 70% and consolidation is performed so as to reduce the pore volume ratio down to a value lying in the range 40% to 60%.

18. It would have been obvious to one of ordinary skill in the art at the time of the invention to have incorporated a reduction of pore volume in the amount lying in the range of 8% to 60%. Boyce et. al. teach that insertion of rigid pins in the consolidated porous structure results in significant enhancement of the composite structure including improvement in critical strain energy release rate without a decrease in in-plane tensile strength or interlaminar shear strength (**Col. 4 lines 8-20**). It follows that, Boyce et. al. teach the principle that insertion of pins results in porosity dynamics effective for strength property modification. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified (decreased) the pore volume by the insertion of reinforcing pins anywhere within the range of 8% to 60% for the purpose of selectively modifying the strength properties of the composite material.

19. **Claims 6-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Boyce et. al. (U.S. Patent No. 4,808,461) in view of applicant's admitted prior art.**

20. Claim 6: Boyce et. al. teach the method of claim 1 but do not specifically teach the method wherein said at least one fiber structure is consolidated by forming a deposit of ceramic or of carbon.

21. Applicant's admitted prior art (**page 2, lines 15-20**) teaches the method wherein each fiber structure is consolidated by forming a deposit of ceramic or of carbon.

22. It would have been obvious to one of ordinary skill in the art at the time of the invention to have incorporated the ceramic or carbon deposit of applicant's admitted

Art Unit: 3726

prior art with the method of Boyce et. al. for the purpose of providing desirable consolidation properties.

23. Claim 7: Boyce et. al./Applicant's admitted prior art teach the method of claim 6 as described above. Applicant's admitted prior art (**page 2, line 10**) also teaches the method wherein said at least one fiber structure is consolidated by chemical vapor infiltration.

24. It would have been obvious to one of ordinary skill in the art at the time of the invention to have incorporated the chemical vapor infiltration of applicant's admitted prior art with the method of Boyce et. al. for the purpose of providing desirable consolidation properties.

25. Claim 8: Boyce et. al./Applicant's admitted prior art teach the method of claim 7 as described above. Applicant's admitted prior art (**page 1, lines 27-32**) also teaches the method wherein said at least one fiber structure is consolidated by forming a ceramic deposit by chemical vapor infiltration after forming an interphase layer on the fibers of the fiber structure, said interphase layer lying between the fibers and the ceramic deposit.

26. It would have been obvious to one of ordinary skill in the art at the time of the invention to have incorporated the interphase layer of applicant's admitted prior art with the method of Boyce et. al. for the purpose of providing desirable reinforcement of the fibers.

27. Claim 9: Boyce et. al./Applicant's admitted prior art teach the method of claim 6 as described above. Applicant's admitted prior art (**page 2, lines 3-8**) also teaches the

method wherein said at least one fiber structure is consolidated by being impregnated with a liquid composition containing a ceramic or carbon precursor, and by transforming the precursor into ceramic or carbon.

28. It would have been obvious to one of ordinary skill in the art at the time of the invention to have incorporated the precursor method of applicant's admitted prior art with the method of Boyce et. al. for the purpose of providing ideal densification properties.

29. Claim 10: Boyce et. al./Applicant's admitted prior art teach the method of claim 9 as described above but do not specifically teach the method wherein a composition is used containing a ceramic or carbon precursor in solution.

30. Examiner notes that it is well known in the art of composite making to provide a ceramic or carbon precursor in solution. Therefore, it would have been well within the ordinary skill in the art to have incorporated a ceramic or carbon precursor in solution in the precursor methods of Boyce/Applicant's admitted prior art.

31. Claim 11: Boyce et. al. teach the method of claim 1 but do not specifically teach the method wherein pins are used that have been made by densifying and stiffening a yarn or tow by means of a matrix.

32. Applicant's admitted prior art (**page 1, lines 20-26**) teaches the method wherein pins are used that have been made by densifying and stiffening a yarn or tow by means of a matrix.

Art Unit: 3726

33. It would have been obvious to one of ordinary skill in the art at the time of the invention to have incorporated the matrix of applicant's admitted prior art with the method of Boyce et. al. for the purpose of densifying and stiffening.

34. **Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Boyce et. al. (U.S. Patent No. 4,808,461) in view of Childress (U.S. Patent No. 6,268,049).**

35. Claim 14: Boyce et. al. teach the method of claim 1 as described above but do not specifically teach the method wherein the pins are implanted in at least two different directions.

36. Childress teaches the method wherein the pins are implanted in at least two different directions (**Fig. 2; Col. 4 lines 46-55**) for the purpose of providing ideal reinforcing properties and to prevent cracking.

37. It would have been obvious to one of ordinary skill in the art at the time of the invention to have incorporated the multidirectional pins of Childress in the method of Boyce et. al. for the purpose of providing ideal reinforcing properties and to prevent cracking.

### ***Conclusion***

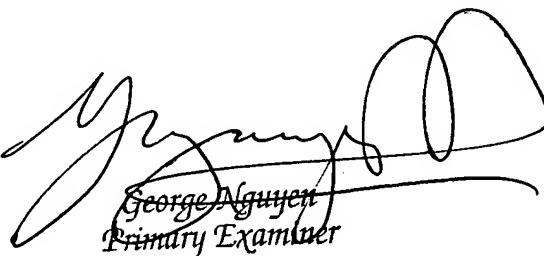
38. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher K. Agrawal whose telephone number is (571) 272-3578. The examiner can normally be reached on Mon-Fri 8:30AM-5:00PM.

Art Unit: 3726

39. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, George Nguyen can be reached on (571) 272-4491. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

40. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

CKA



George Nguyen  
Primary Examiner